5V 1A Low Dropout Regulator with Enable

Features

- **Dropout voltage 0.5V @ I_O = 1A**
- **Output current in excess of 1A**
- **Output voltage accuracy ±2.5%**
- **Quiescent current, typically 5mA**
- **Internal short circuit current limit**
- **Internal over temperature protection**
- **ON/OFF control**

General Description

The G9105 positive 5V voltage regulator features the ability to source 1A of output current. The dropout voltage is 0.5V at 1A output current. The typical quiescent current is 5mA. Furthermore, the quiescent current is smaller when the regulator is in the dropout mode (V_{IN} < 5.5V).

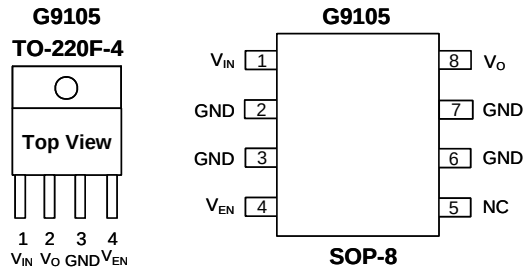
Familiar regulator features such as over temperature and over current protection circuits are provided to prevent it from being damaged by abnormal operating conditions. A V_{EN} pin is provided to disable the output when needed.

Ordering Information

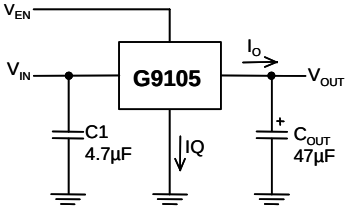
ORDER NUMBER	ORDER NUMBER (Pb free)	MARKING	TEMP. RANGE	PACKAGE
G9105TF1T	G9105TF1Tf	G9105	-40°C to +85°C	TO-220F-4
G9105TH1T	G9105TH1Tf	G9105	-40°C to +85°C	TO-220F-4
---	G9105P11U	G9105	-40°C to +85°C	SOP-8

Note: TF :TO220F-4 (short lead) TH :TO220F-4 (long lead) P1: SOP-8
1: Bonding Code
T: Tube U: Tape & Reel

Package Type



Typical Application



Absolute Maximum Ratings (Note 1)

Input Voltage. 8V
V_{EN} Voltage 8V
Power Dissipation Internally Limited (Note 2)
Maximum Junction Temperature . . . . . 150°C
Storage Temperature Range. . . . .-65°C ≤ T_J ≤+150°C
Reflow Temperature (soldering, 10 sec) . . . . . 260°C
Continuous Power Dissipation (T_A = +25°C)
TO-220F-4 No Heatsink . . . . . .80°C/W
TO-220F-4 with Infinite Heatsink . . . . . 36°C/W
Thermal Resistance Junction to Ambient, (θ_{JA})
SOP-8. . . . . .180°C/W

Operating Conditions (Note 1)

Input Voltage . . . . . 5.5V~7V
Temperature Range. . . . . -20°C ≤ T_A ≤85°C
V_{EN} Voltage . . . . . .V_{IN}+0.3V

Electrical Characteristics

V_{IN} =7V, I_O = 0.5A, C_{IN} = 4.7µF, C_{OUT} =47µF, T_A = T_J = 25°C unless otherwise specified [Note 3]

PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Output Voltage	V_O	I_O = 0.5A	4.875	5	5.125	V
Line Regulation		5.5V ≤ V_{IN} ≤ 7V, I_O = 10mA	---	0.5	2	%
Load Regulation		50mA ≤ I_O ≤ 1A	---	0.5	2	%
Quiescent Current	I_Q	V_{IN} = 5.5V, V_{EN} = V_{IN}	---	5	10	mA
		V_{IN} = 5.5V, V_{EN} = 0V	---	10	30	µA
Ripple Rejection		fi = 120Hz, 1VP-P, I_O = 100mA	---	35	---	dB
Dropout Voltage	V_D	I_O = 1A	---	---	0.5	V
Short Circuit Current			---	1.9	---	A
Over Temperature			---	150	---	°C
V_{EN} Voltage High	V_{ENH}	Output Active	2	---	---	V
V_{EN} Voltage Low	V_{ENL}	Output Disabled	---	---	0.8	V
V_{EN} Bias Current High	I_{ENH}	V_{EN} = 2.7V	---	---	20	µA
V_{EN} Bias Current Low	I_{ENL}	V_{EN} = 0.4V	---	---	20	µA

Note 1: Absolute Maximum Ratings are limits beyond which damage to the device may occur. Operating Conditions are conditions under which the device functions but the specifications might not be guaranteed. For guaranteed specifications and test conditions see the Electrical Characteristics.

Note2: The maximum power dissipation is a function of the maximum junction temperature, T_{Jmax} ; total thermal resistance, θ_{JA}, and ambient temperature T_A. The maximum allowable power dissipation at any ambient temperature is T_{jmax}-T_A / θ_{JA}. If this dissipation is exceeded, the die temperature will rise above 150°C and IC will go into thermal shutdown. For the TO-220F-4 package, θ_{JA} is 80°C/W (No heat sink).

Note3: Low duty pulse techniques are used during test to maintain junction temperature as close to ambient as possible.

Note4: The type of output capacitor should be tantalum or aluminum.

Definitions

Dropout Voltage

The input/output Voltage differential at which the regulator output no longer maintains regulation against further reductions in input voltage. Measured when the output drops 2% below its nominal value, dropout voltage is affected by junction temperature, load current and minimum input supply requirements.

Line Regulation

The change in output voltage for a change in input voltage. The measurement is made under conditions of low dissipation or by using pulse techniques such that average chip temperature is not significantly affected.

Load Regulation

The change in output voltage for a change in load current at constant chip temperature. The measurement is made under conditions of low dissipation or by using pulse techniques such that average chip temperature is not significantly affected.

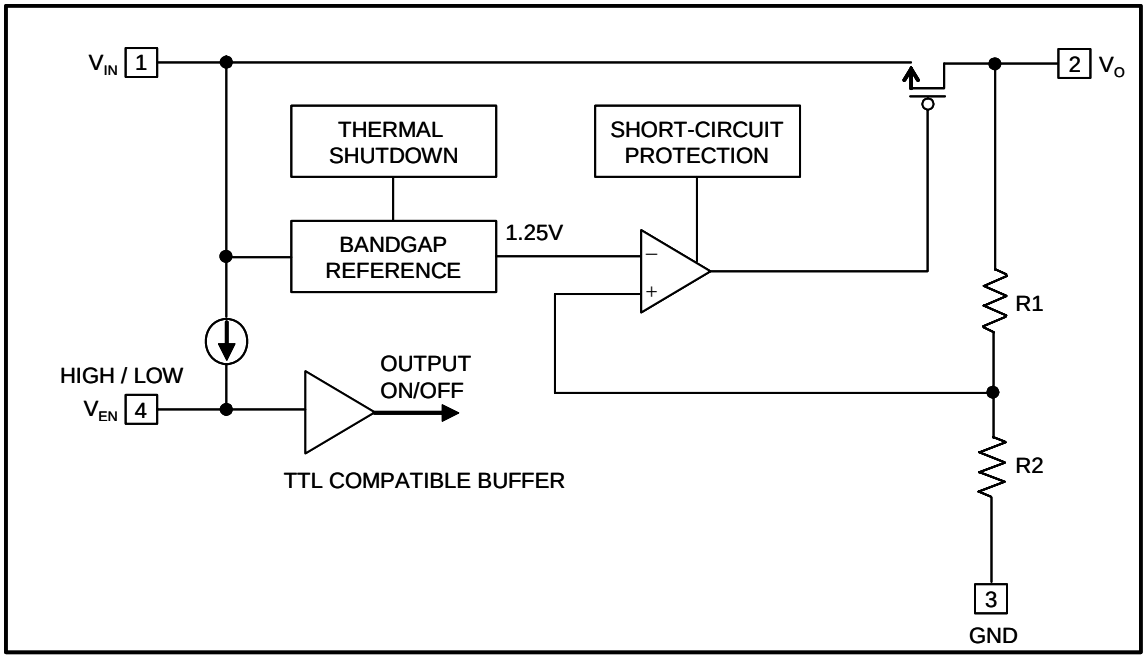
Maximum Power Dissipation

The maximum total device dissipation for which the regulator will operate within specifications.

Quiescent Bias Current

Current which is used to operate the regulator chip and is not delivered to the load.

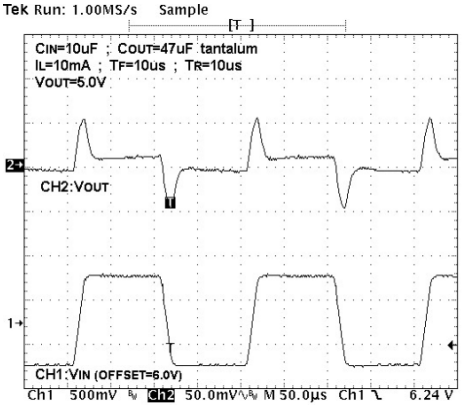
Block Diagram



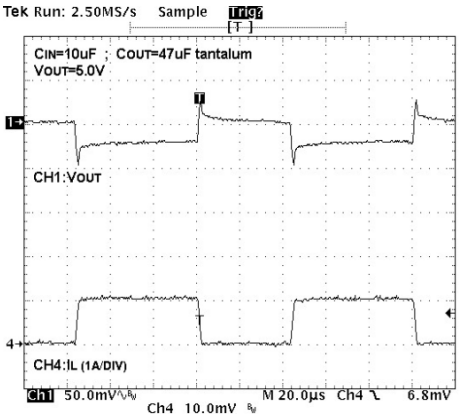
Typical Performance Characteristics

(V_{IN}=5V, C_{IN}=10µF, C_{OUT} =47µF, T_A=25°C, unless otherwise noted.)

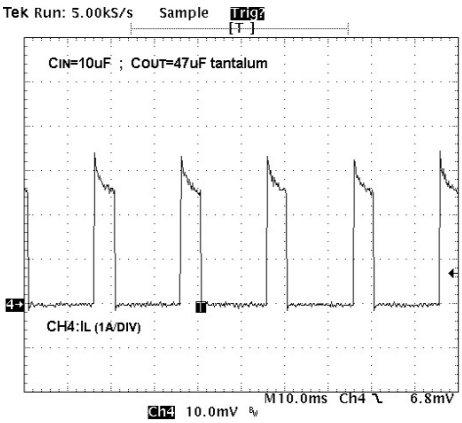
Line Transient Response



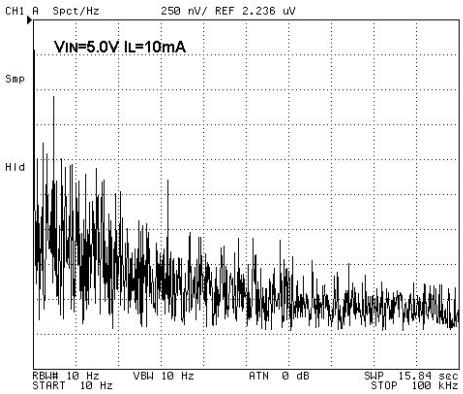
Load Transient Response



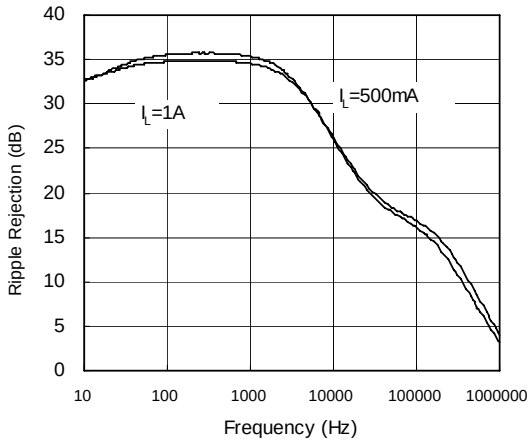
Short Circuit-Current



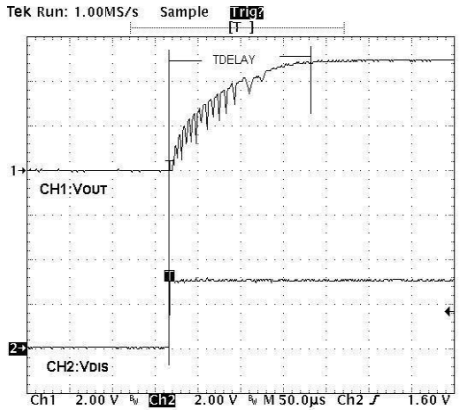
Output Noise



Ripple Rejection

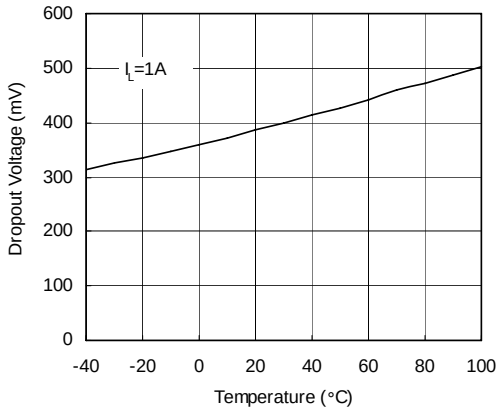


V_{EN}-ON

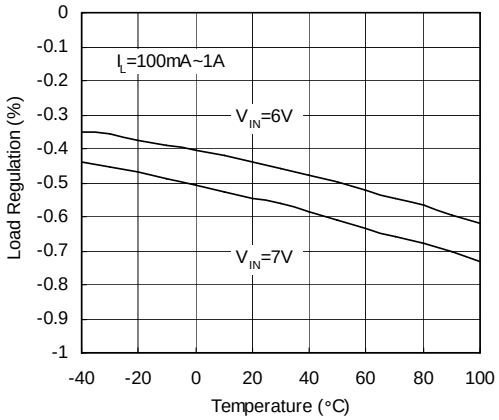


Typical Performance Characteristics (continued)

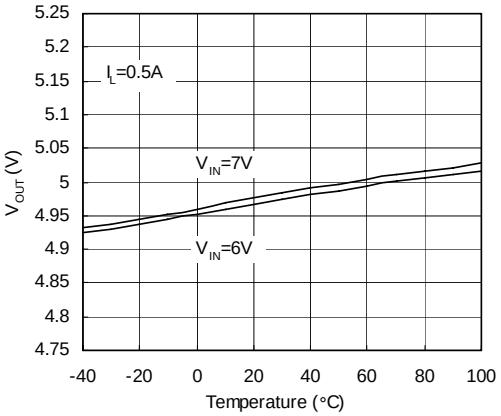
Dropout Voltage vs. Temperature



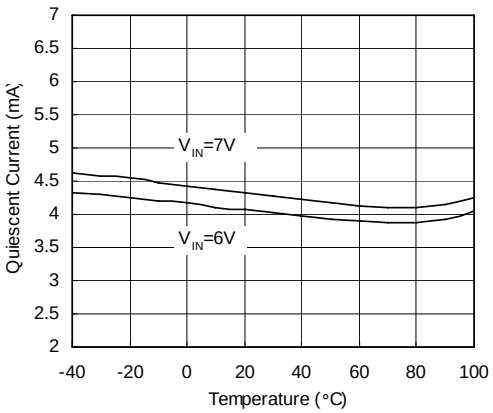
Load Regulation



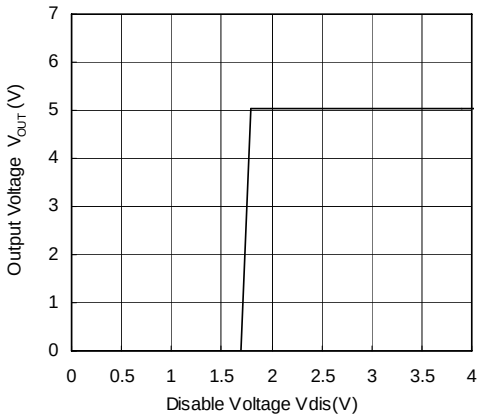
Output Voltage vs. Temperature



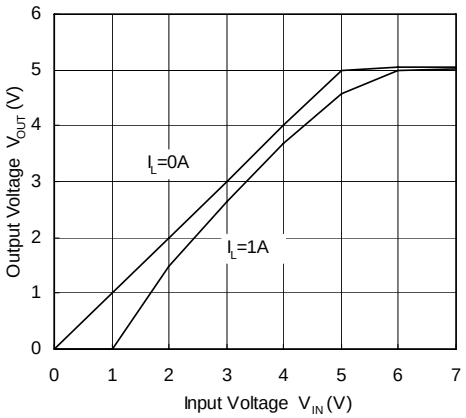
Quiescent Current vs. Temperature



Output Voltage vs. Disable Voltage

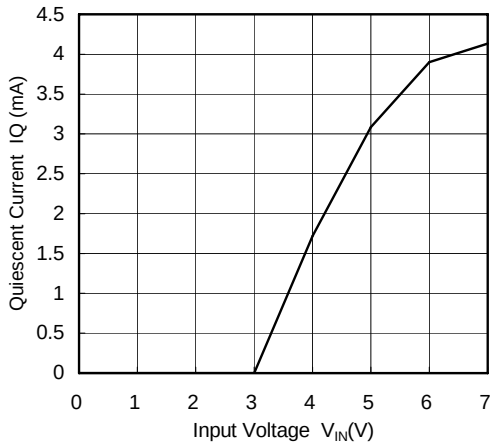


Output Voltage vs. Input Voltage

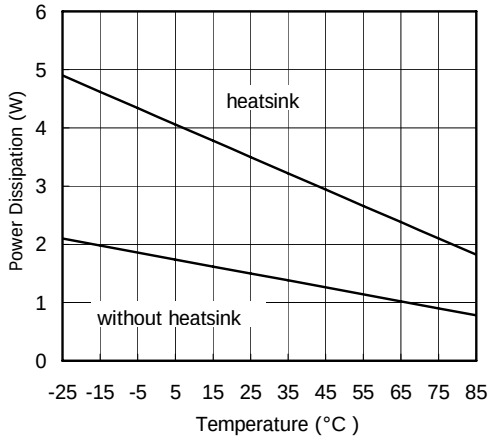


Typical Performance Characteristics (continued)

Quiescent Current vs. Input Voltage

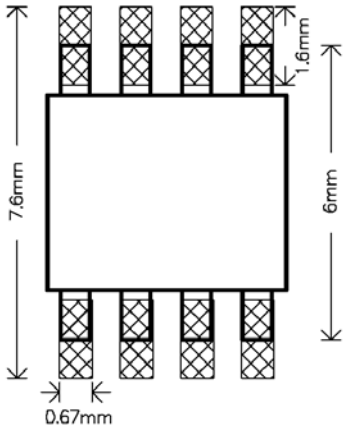


Power Dissipation vs. Temperature (TO-220F)



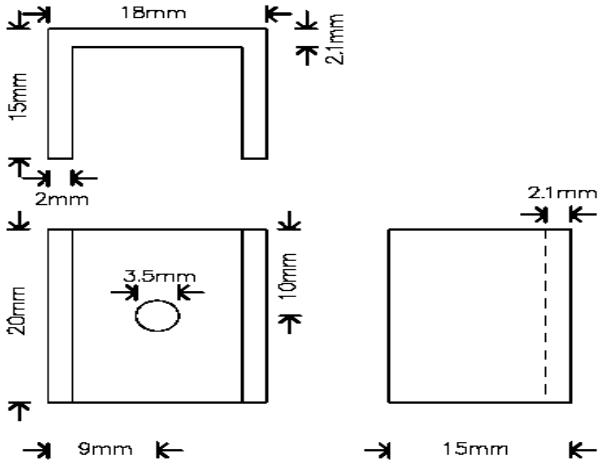
Recommended Minimum Footprint

SOP-8

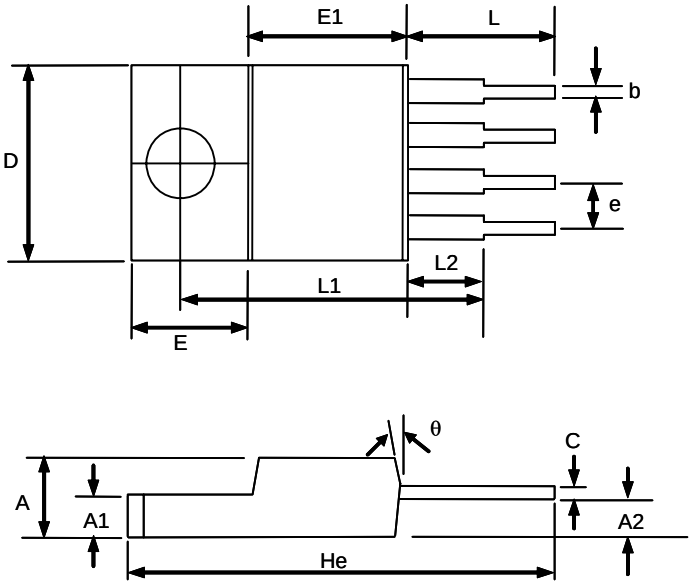


Heatsink Package Dimension

TO-220F-4

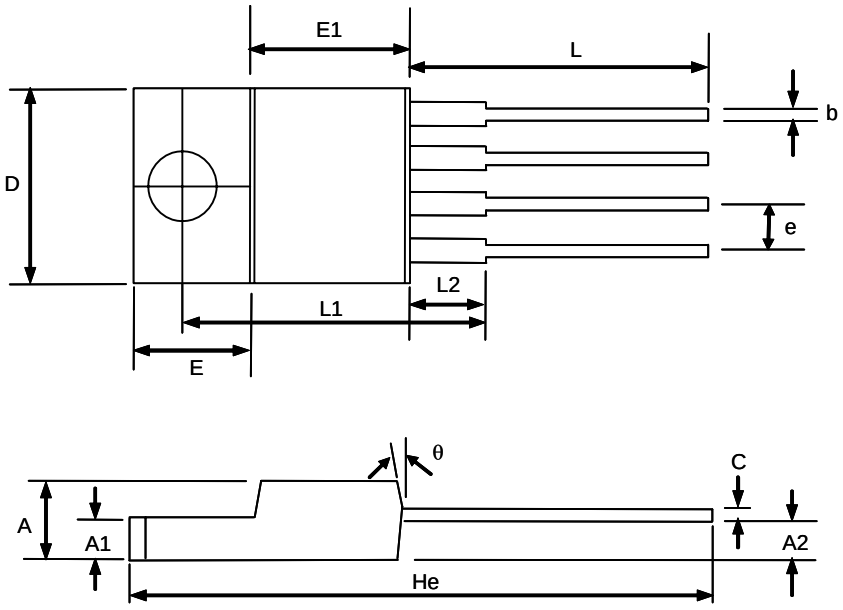


Package Information



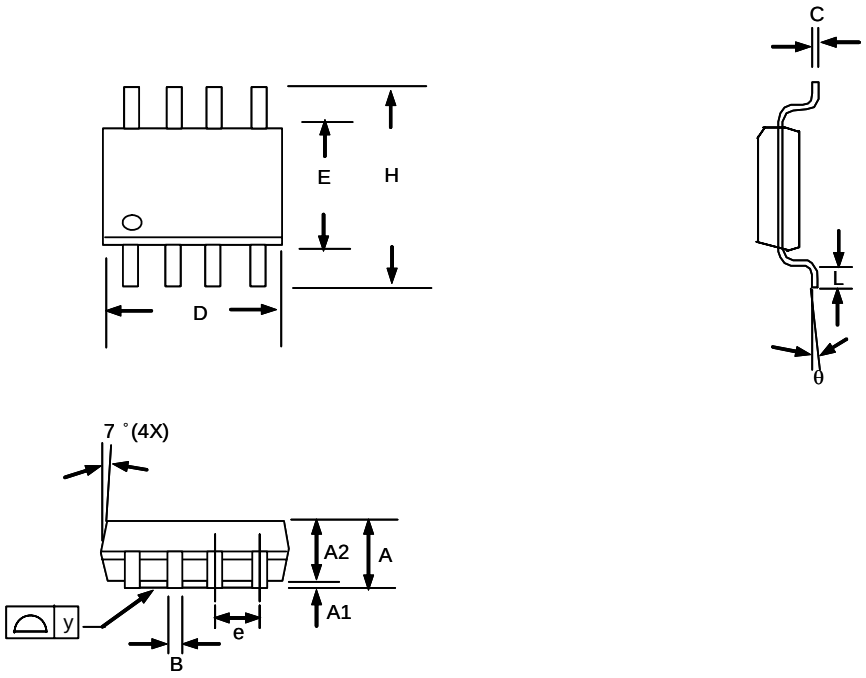
TO-220F-4 Package (short lead)

SYMBOL	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	4.42	4.57	4.72	0.174	0.180	0.186
A1	2.69	2.79	2.89	0.106	0.110	0.114
A2	1.68	1.78	1.88	0.066	0.070	0.074
D	10.00	10.10	10.20	0.394	0.398	0.402
E	6.85	6.95	7.05	0.269	0.273	0.278
E1	8.54	8.64	8.74	0.336	0.340	0.344
L	7.15	7.35	7.55	0.281	0.289	0.297
L1	16.56	16.66	16.76	0.652	0.656	0.660
L2	3.60	3.70	3.80	0.142	0.146	0.150
He	22.54	22.94	23.34	0.887	0.903	0.919
C	-----	0.48	-----	-----	0.019	-----
e	-----	2.54(TYP)	-----	-----	0.1(TYP)	-----
b	-----	0.635(TYP)	-----	-----	0.025(TYP)	-----
θ	4°	7°	11°	4°	7°	11°



TO-220F-4 Package (long lead)

SYMBOL	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	4.42	4.57	4.72	0.174	0.180	0.186
A1	2.69	2.79	2.89	0.106	0.110	0.114
A2	1.68	1.78	1.88	0.066	0.070	0.074
D	10.00	10.10	10.20	0.394	0.398	0.402
E	6.85	6.95	7.05	0.269	0.273	0.278
E1	8.54	8.64	8.74	0.336	0.340	0.344
L	13.15	13.35	13.55	0.518	0.526	0.533
L1	16.56	16.66	16.76	0.652	0.656	0.660
L2	3.60	3.70	3.80	0.142	0.146	0.150
He	28.44	28.94	29.44	1.119	1.139	1.159
C	-----	0.48	-----	-----	0.019	-----
e	-----	2.54(TYP)	-----	-----	0.1(TYP)	-----
b	-----	0.635(TYP)	-----	-----	0.025(TYP)	-----
θ	4°	7°	11°	4°	7°	11°



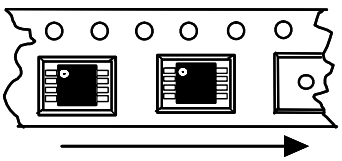
SOP-8 Package

Note:

1. Package body sizes exclude mold flash and gate burrs
2. Dimension L is measured in gage plane
3. Tolerance 0.10mm unless otherwise specified
4. Controlling dimension is millimeter converted inch dimensions are not necessarily exact.

SYMBOL	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	1.35	1.60	1.75	0.053	0.063	0.069
A1	0.10	-----	0.25	0.004	-----	0.010
A2	-----	1.45	-----	-----	0.057	-----
B	0.33	-----	0.51	0.013	-----	0.020
C	0.19	-----	0.25	0.007	-----	0.010
D	4.80	-----	5.00	0.189	-----	0.197
E	3.80	-----	4.00	0.150	-----	0.157
e	-----	1.27	-----	-----	0.050	-----
H	5.80	-----	6.20	0.228	-----	0.244
L	0.40	-----	1.27	0.016	-----	0.050
y	-----	-----	0.10	-----	-----	0.004
θ	0°	-----	8°	0°	-----	8°

Taping Specification



Feed Direction
Typical SOP Package Orientation

PACKAGE	Q'TY/BY TUBE	Q'TY/REEL
TO-220F-4	50 ea	---
SOP-8	---	2,500 ea

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